Honors Chemistry - Nuclear Chemistry Problem Set

Stasya

1. Compare and contrast chemical reactions and nuclear reactions in terms of energy changes and the particles involved.

2. Explain the relationship between an atom's neutron-to-proton ratio and its stability.

3. Write a balanced nuclear reaction for the alpha decay of americium-241.

4. Carbon-14 dating makes use of a specific ratio of two different radioisotopes. Define the ratio used in carbon-14 dating. Why is this ratio constant in living organisms?

5. Technetium-104 has a half-life of 18.0 minutes. How much of a 165.0 g sample remains after 90.0 minutes?

6. A sample initially contains 150.0 mg of radon-222. After 11.4 days, the sample contains 18.7 mg of radon-222. Calculate the half-life.

7. Describe the current limitations of fusion as a power source.

8. Discuss how the amount of fissionable material present affects the likelihood of a chain reaction.

9. Describe the penetration power of alpha, beta, and gamma radiation.